REMARKS

Claims 1, 3-7, 9-13, 15-19, and 21-28 are all the claims pending in the application. Claims 25-28 stand objected to only upon informalities and are apparently otherwise allowable (once the obviousness-type double patenting rejection is removed by the accompanying terminal disclaimer). Therefore, claims 25-28 are rewritten in independent form to place them in condition for immediate allowance.

Claims 1, 3-7, 9-13, 15-19 and 21-24 stand rejected on prior art grounds. Claims 1, 7, 13, 19, and 25-28 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-4 of U.S. Patent No. 6,301,689. Applicants respectfully traverse these objections/rejections based on the following discussion.

I. The Prior Art Rejections

Claims 1, 3-7, 9-13, 15-19 and 21-24 stand rejected under 35 U.S.C. §102(e) as being anticipated by Kawakami et al. (US Patent No. 5,062,054) hereinafter "Kawakami". Applicants respectfully traverse this rejection based on the following discussion.

A. The Rejection Based on Kawakami et al.

While the Office Action argues that Applicants' argued points of novelty are not included in the claims, Applicants note that independent claims 1, 7, 13, and 19 define "checking whether said possible error rectangle is a true error." The Office Action proposes that column 6, lines 17-46 of Kawakami teach this feature; however, this portion of Kawakami only explains that adjacent rectangles are determined to be "Free" if they are not on the same level or, if at all are on the same level, whether they have sufficient spacing. This process in Kawakami only determines whether there are possible errors and Kawakami does not proceed further to check whether these possible errors are true errors, as the claimed invention does. As shown in greater detail below, it is

therefore Applicants' position that a number of claimed features are not taught or suggested in the prior art of record and that the independent claims are patentable over prior art of record.

The Office Action states that Kawakami first determines whether rectangles are adjacent one another (and that this represents a possible error) and then determines whether the adjacent rectangles violate minimum spacing rules (and that this represents a true error). Applicants initially submit that this is not a two-step process in Kawakami and that the Office Action is artificially creating such a two-step process from what is clearly described in Kawakami as a one-step process. In other words, the process of determining whether two rectangles have the required minimum spacing must necessarily first determine whether rectangles are adjacent one another. If the process in Kawakami is actually a two-step process, then the invention must have a three-step process because the claimed invention includes an additional step of determining whether the first spacing-type of possible error (whether the possible error is determined in a one- or two-step process) is a true error.

Further, this argument ignores the claim language of claims 1, 7, 13, and 19, which defines the "possible error rectangle" occurs when there is a "minimum spacing" violation. The determination in Kawakami of whether there is a "Free" condition is a minimum spacing type of test (column 6, lines 33-38). Therefore, the only type of error condition being described in Kawakami is the type of error condition that the claims defined as a "possible error" regardless of how many steps (or sub-steps) are necessary to check for this type of error. Thus, Applicants submit that even if the determination of whether rectangles are "Free" in Kawakami is broken into a number of different steps, Kawakami does not teach the additional claimed process of determining whether this error is a "true error" and that Kawakami therefore does not teach or suggest the claimed invention.

Determining whether or not the condition "Free" is met only determines whether rectangles overlap and does not determine if a possible error rectangle is a true error. Further, any form of semantic argument regarding the possible different meanings of the term "Free" still fails to disclose the claimed invention because Kawakami only teaches a single "Free" condition while the invention teaches a first condition (possible error) and a

second condition (true error). Therefore, if one were to argue that the "Free" condition is equivalent to the claimed true error then Kawakami could not teach or suggest the claimed "possible error" because Kawakami only teaches a single "Free" condition. In other words, Kawakami only performs a single type of error checking process (regardless of how many sub-steps can be imagined) while the claimed invention performs two types of error checking processes, a first of which relates to a possible error, and the second of which relates to a true error. Thus, Applicants submit that no reading of Kawakami can teach or suggest the claimed invention because Kawakami only teaches a single type of error while the invention claims two types of errors (possible and true).

A possible error indicates that two adjacent rectangles on the same layer are located such that the distance between the two rectangles is less than the minimum distance allowed. This says nothing about what other shapes might exist in the area between the two adjacent rectangles. Kawakami only determines that there might be a vacant area between the pairs of adjacent rectangles identified by the adjacent rectangle search unit. Neither the adjacent rectangle search unit (34) nor the spacing check unit (36) examine the area between the two rectangles. There could easily be metal existent between the two adjacent rectangles, and Kawakami's algorithm would perform no differently. Only the claimed invention goes further and checks what is in the area between the two adjacent rectangles or what is along the edges of this area.

Consider an example where all rectangles are on the same layer and have the same potential number. Assume the distance between two rectangles is less than the minimum space allowed. These two rectangles would not meet Kawakami's condition 'Free'. As such, the error data output unit (71) of Kawakami would indicate an error. Regardless of what metal exists already in the area between the two adjacent rectangles, Kawakami is going to insert new metal covering the area between the two rectangles. The Kawakami approach then merges all of the rectangle shapes together. Therefore, if metal really existed in the area between the two rectangles prior to the addition of new metal, Kawakami would simply add more metal, which could alter circuit performance dramatically. Kawakami does nothing to ensure a potential spacing error is a true spacing error. In today's modern technologies, where accurate wire delay is vital, Kawakami's approach is no longer a viable solution. One can no longer add metal

without careful consideration. Instead, prior to the invention, it was necessary to flag the notches and slits as errors to be examined by the physical designer rather than filling them with metal.

To the contrary, the invention creates a "possible error rectangle" and checks whether this "possible error rectangle" is actually a "true error." These concepts are not taught or suggested by Kawakami principally because Kawakami simply identifies an error if rectangle A overlaps rectangle B, and does not go further to perform any processing on the claimed "possible error rectangle". Applicants' Figure 2 illustrates two metal shapes M1 and M2 and their respective minimum spacing rectangles S1 and S2. When one metal shape falls within the minimum spacing rectangle of another metal shape, as shown in Figure 2, the invention compares the shortest distance between the metal shapes to the spacing requirement for the metal shapes and, if the shortest distance is less than the required distanced, the invention identifies a possible spacing error and forms a possible error rectangle P1, as illustrated in Figure 3. To the contrary, at this point, Kawakami classifies any overlap as an error and does not perform any further analysis.

The invention continues on and, once all possible error rectangles have been determined and a list of possible spacing errors created, the claimed invention seeks to eliminate possible error rectangles from the possible error list. The invention classifies each spacing error as non-diagonal or diagonal. A possible diagonal spacing error P1 is illustrated in Figure 4 between metal shapes M1 and M2. Figure 4 also illustrates a possible non-diagonal (e.g., a horizontal or vertical) error P2.

The invention determines whether a non-diagonal possible spacing error constitutes an actual spacing error by examining if the possible error rectangle is covered by other metal. If the non-diagonal possible spacing rectangle is entirely covered by another conductor (e.g., other metal), no error exists, and the invention removes the possible spacing error rectangle from the possible error list. For example, as illustrated in Figure 5, metal shape M3 completely covers possible error P1. Therefore, since no actual space exists between metal shapes M1 and M2 , the possible error rectangle P1 illustrated in Figure 5 is not a true spacing error and is properly removed from the possible error list.

Thus, the claimed invention includes a process of "identifying a possible error rectangle when a first conductor rectangle of said plurality of conductor rectangles occupies a portion of a minimum spacing rectangle of a second conductor rectangle of said conductor rectangles", as defined by independent claims 1, 7, 13, and 19. This is as far as the process in Kawakami proceeds. However, the claimed invention goes beyond finding possible error rectangles and, instead includes a process of "checking whether said possible error rectangle is a true error", as also defined by independent claims 1, 7, 13, and 19. Therefore, the claimed invention clearly goes beyond the teaching in Kawakami and provides an additional process which checks whether the possible errors are actually true errors before performing any corrective action. This allows the invention to reduce the number of unnecessary corrections that are made with conventional systems such as the one in Kawakami.

In view of the foregoing, Applicant respectfully submits that independent claims 1, 7, 13, and 19 are not taught or suggested by Kawakami and are patentable over Kawakami. Further, dependent claims 3-6, 9-12, 15-18, and 21-24 are similarly patentable over Kawakami, not only by virtue of their dependency from a patentable independent claim, but also by virtue of the additional features of the invention they define. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

II. The Double Patent Rejection

Claims 1, 7, 13, 19, and 25-28 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-4 of U.S. Patent No. 6,301,689, hereinafter "Darden". A Terminal Disclaimer is filed herewith, thereby rendering this rejection moot.

III. Formal Matters and Conclusion

In view of the foregoing, Applicants submit that claims 1, 3-7, 9-13, 15-19 and 21-28, all the claims presently p nding in the application, are patentably distinct from the

prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary.

Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 09-0456.

Respectfully submitted,

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